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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/542,178	07/08/2005	C. David Allis	00856-03	4003

34444 7590 10/24/2007

UNIVERSITY OF VIRGINIA PATENT FOUNDATION
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CHARLOTTESVILLE, VA 22902

EXAMINER	
SZPERKA, MICHAEL EDWARD	
ART UNIT	**PAPER NUMBER**
1644	
MAIL DATE	**DELIVERY MODE**
10/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/542,178	ALLIS ET AL.	
	Examiner	Art Unit	
	Michael Szperka	1644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 August 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) *1-9 and 14-21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/16/05, 3/31/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☒ Other: Sequence alignments

DETAILED ACTION

1. Applicant's response received August 20, 2007 is acknowledged.

Claims 1-21 are pending in the instant application.

Applicant's election of Group III, claims 10-13, drawn to methods of decreasing fertility in the reply filed on August 20, 2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 1-9 and 14-21 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on August 20, 2007 as explained above.

Information Disclosure Statement

2. Applicant's IDS forms received 9/16/05 and 3/31/06 have been considered.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 10 and 11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

Applicant has claimed broad methods reciting the administration of inhibitors of ePAD activity. The specification discloses that ePAD stands for "egg and embryo abundant PAD" and that PADs are peptidylarginine deiminase proteins (see particularly lines 3-8 of page 3 of the specification). The specification further discloses the sequences of two particular ePAD genus members, mouse ePAD (SEQ ID NO:3) and human ePAD (SEQ ID NO:1), but it does not appear that the specification defines the genus of ePAD proteins as being limited to these two species. Further, the specification does not appear to disclose a particular structure common to all members of the ePAD genus that would allow a skilled artisan to distinguish other ePAD proteins from the large genus of peptidylarginine deiminases which are not ePAD proteins. The specification also discloses a non-limiting list of potential ePAD inhibitors including transcription factor inhibitors, antisense, ribozymes, gene replacement constructs and antibodies (see particularly lines 24-30 of page 14).

The guidelines for the Examination of Patent Applications Under the 35 U.S.C. 112, § 1 "Written Description" Requirement make clear that if a claimed genus does not show actual reduction to practice for a representative number of species, then the Requirement may be alternatively met by reduction to drawings, or by disclosure of relevant, identifying characteristics, i.e., structure or other physical and or chemical properties, by functional characteristics coupled with a known or disclosed correlation between function and structure, or by a combination of such identifying characteristics, sufficient to show the applicant was in possession of the genus (Federal Register, Vol. 66, No. 4, pages 1099-1111, January 5, 2001, see especially page 1106 column 3).

In The Regents of the University of California v. Eli Lilly (43 USPQ2d 1398-1412) 19 F. 3d 1559, the court held that disclosure of a single member of a genus (rat insulin) did not provide adequate written support for the claimed genus (all mammalian insulins), and in the instant application applicant has disclosed the human sequence of SEQ ID NO:23 and has claimed homologues from other species. In this same case, the court also noted: "A definition by function, as we have previously indicated, does not suffice to define the genus because it is only an indication of what the gene does, rather than what it is. See Fiers, 984 F.2d at 1169-71, 25 USPQ2d at 1605-06 (discussing Amgen).

It is only a definition of a useful result rather than a definition of what achieves that result. Many such genes may achieve that result. The description requirement of the patent statute requires a description of an invention, not an indication of a result that one might achieve if one made that invention. See In re Wilder, 736 F.2d 1516, 1521, 222 USPQ 369, 372-73 (Fed. Cir. 1984) (affirming rejection because the specification does "little more than outlin [e] goals appellants hope the claimed invention achieves and the problems the invention will hopefully ameliorate."). Accordingly, naming a type of material generally known to exist, in the absence of knowledge as to what that material consists of, is not a description of that material."

The court has further stated that "Adequate written description requires a precise definition, such as by structure, formula, chemical name or physical properties, not a mere wish or plan for obtaining the claimed chemical invention." Id. at 1566, 43 USPQ2d at 1404 (quoting Fiers, 984 F.2d at 1171, 25 USPQ2d at 1606). Also see Enzo-Biochem v. Gen-Probe 01-1230 (CAFC 2002).

As discussed above, applicant has disclosed two members of the genus of ePAD molecules but does not appear to have disclosed what structure or structures distinguish SEQ ID NOs:1 and 3 from the broader genus of peptidylarginine deiminases in general. Therefore the disclosed sequences do not appear to be representative members of the genus because the representative structure of ePAD proteins that allow for discrimination against the larger genus of peptidylarginine deiminases does not appear to be disclosed. Further, applicant has claimed methods wherein inhibitors of ePAD proteins are administered, such inhibitors comprising a wide variety of structural and functional mechanisms that mediate ePAD inhibition. Given the diversity of structure and mechanistic pathways of action for the inhibitors, it appears that the recited genus of inhibitors lacks a common core structure or a correlation between their collective structures and function. Additionally, it logically follows that if the genus of ePAD proteins lacks adequate written description, then the genus of inhibitors of ePAD proteins must also lack adequate written description.

Therefore, skilled artisan would reasonably conclude that applicant was not in possession of the full breadth of the claimed genus of methods of administering ePAD

inhibitors to decrease fertility at the time the instant application was filed.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 10 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Herr et al. (WO 01/53339, of record on the 3/31/06 IDS).

Herr et al. disclose a novel mouse peptidylarginine deiminase (PAD) protein that is expressed only in gametes named MOP5 (see entire document, particularly the abstract and page 9). As demonstrated by the attached sequence alignments, MOP5 is identical to SEQ ID NO:3 of the instant specification. Note that SEQ ID NO:3 is disclosed as being mouse ePAD on page 4 of the instant specification. Herr et al. further disclose that egg surface antigens, MOP5 included, are to be used in the production of antibodies, with such antibodies then being used in contraceptive methods (see particularly lines 10-23 of page 4 and lines 10-19 of page 7). Contraceptive methods are disclosed which comprise passive immunization with preformed antibodies that bind MOP5 as well as active immunization methods wherein MOP5 or a fragment thereof is administered to a female subject such that a neutralizing antibody response is elicited by the subject's immune system which is specific for MOP5 (see particularly lines 11-28 of page 16 and lines 3-27 of page 17).

Therefore, the prior art anticipates the claimed invention.

7. Claim 10 is rejected under 35 U.S.C. 102(b) as being anticipated by Gossen et al. (WO 02/090531, of record on the 9/16/05 IDS).

Gossen et al. disclose the sequence of human PAD6, a novel peptidylarginine deiminase that is only expressed in gametes (see entire document, particularly the

abstract and page 2). They further disclose that inhibitors of PAD6 activity are to be administered to women for use as a contraceptive (see particularly lines 12-17 of page 7 and lines 5-10 of page 8). The instant specification states that ePAD stands for "egg and embryo abundant PAD" (see page 3) and given that Gossen et al disclose that PAD6 is expressed in oocytes (see particularly lines 21-27 of page 16 and Figure 4) it is an ePAD protein.

Therefore, the prior art anticipates the claimed invention.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 10, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herr et al. (WO 01/53339, of record on the 3/31/06 IDS) in view of Gossen et al. (WO 02/090531, of record on the 9/16/05 IDS).

The disclosure of Herr et al. has been discussed above and differs from the instant claimed invention that while Herr et al. disclose methods of contraception comprising passive immunization with antibodies that bind egg-specific peptidylarginine deiminase (PAD) proteins and comprising active immunization with PAD proteins, Herr et al. do not disclose the polypeptide of SEQ ID NO:1 or fragments thereof for use in their contraceptive methods.

Gossen et al. disclose the sequence of human PAD6 and further disclose that contraceptive methods comprise the administration of PAD6 inhibitors to females (see entire document, particularly the abstract and lines 12-17 of page 7). Note that SEQ ID NO:1 of the instant specification comprises all of the sequence information disclosed by Gossen al. as pertaining to human PAD6 (see enclosed sequence alignment).

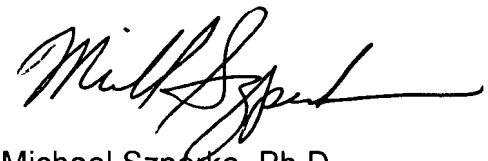
Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to substitute the human PAD6 sequence disclosed by Gossen et al. for MOP5 in the contraceptive methods disclosed by Herr et al. Motivation to do so comes from the fact that MOP5 and PAD6 are both egg-specific peptidylarginine deiminase proteins and the fact that both Gossen et al. and Herr et al. disclose that PAD inhibitors are to be used in contraceptive methods to reduce female fertility. Further note that while PAD6 disclosed by Gossen et al. does not comprise all of the amino acid sequence information of SEQ ID NO:1 of the specification (i.e. PAD6 is smaller), the sequences do align over the entire length of PAD6 such that any antibody which binds an epitope of PAD6 would also bind SEQ ID NO:1 due to sequence identity (see alignment). Note further that this sequence identity means that PAD6 comprises a fragment of SEQ ID NO:1.

10. No claims are allowable.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Szperka whose telephone number is 571-272-2934. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Chan can be reached on 571-272-0841. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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October 19, 2007